A FLAVANONE 7-GLUCOSIDE FROM EUPHORBIA CONDYLOCARPA

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We have previously reported the isolation of a hyperoside from E. condylocarpa [1]. Continuing a study of the flavonoids of this plant, from an ethanolic extract of the leaves of E. condylocarpa we have isolated a substance with the composition $C_{21}H_{22}O_{10}$, mp 222° C (from ethanol, decomp), $[\alpha]_D^{20}$ −129.6° (c 0.617, methanol). The substance consists of crystals in the form of slightly yellowish needles readily soluble in acetone, ethanol, and methanol. On chromatography in a formic acid–ethyl acetate–water (10 : 2 : 3) system it gave a single spot with R_f 0.85 which, on treatment with sodium borohydride, assumed an intense crimson color. This shows the flavanone nature of this substance [2].

On acid hydrolysis of the substance, the aglycone and D-glucose were obtained. The molecular weight of the substance determined by Rast's method and the results of quantitative acid hydrolysis show that the sugar component and the aglycone are present in equimolecular proportions. The UV spectrum of the substance has two well-defined maxima: at 328 and 285 mμ.

On the basis of the bathochromic shifts in the presence of $AlCl_3$, CH_3COONa, $CH_3COONa + H_3BO_3$, and the zirconium–citric acid reagent, we may conclude [3, 4] that a free hydroxyl group is present in position 5, and that there are no hydroxyl groups in positions 3 and 7.

Under the influence of sodium ethoxide, there is a bathochromic shift of the maximum of the first band by 98 mμ, which is not observed in the spectrum of the aglycone. This shift in the first band is characteristic for flavanones with a free 4'-hydroxy group in which the 7-hydroxy group is substituted, which results in isomerization of the flavanone into a chalcone under the action of alkalis [3, 5].

A study of the UV spectra of the aglycone with ionizing and complex-forming additives showed that free hydroxyl groups are present in the C_5, C_7, and $C_{4'}$ positions [3].

The aglycone, $C_{15}H_{12}O_5$, mp 246–247° C (from 50% ethanol) gave no depression of the melting point in admixture with a sample of naringenin, 5, 7, 4'-trihydroxyflavanone, isolated from Salix elbursensis Boiss. [6]. The results of hydrolysis of the glycoside with an enzyme preparation from Aspergillus oryzae shows the β-configuration of the glycoside bond. A comparison of $[\alpha]_D$ and $[M]_D$ of the glycoside with the corresponding constants of phenyl glucosides showed that the sugar component, β-D-glucose, is in the form of β-D-glucofuranose. This is also confirmed by IR spectroscopy (1085 and 1045 cm^{-1}) [7]. Thus, the substance that we have isolated is naringenin 7-O-β-D-glucofuranoside, and this is the first time it has been characterized for plants of the genus Euphorbia.

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